# Canon Envirothon Forestry Study Guide

# Key Point 1—Tree Physiology and Tree and Shrub Identification

National Science Standards Correlation

**Learning Objectives:**

1. Know the parts and tissues of a tree, and be able to explain the growth cycle and life cycle of a tree.
2. Understand the processes of photosynthesis and respiration and how they are important to the growth and reproduction of trees.
3. Identify common tree species without a key, and identify specific or unusual trees and shrubs through the use of a key.

**Suggested Activities:**

1. Identify trees and shrubs using leaf and seed samples.

**Suggested Resources:**

1. Tree Physiology
2. Parts of a Tree
3. Glossary of Tree Terms
4. How Does a Tree Grow
5. Key for Tree ID

# Key Point 2—Forest Ecology

National Science Standards Correlation

**Learning Objectives**:

1. Know the typical forest structure: canopy, understory and ground layers and crown classes.
2. Understand forest ecology concepts and factors affecting them, including the relationship between soil and forest types, tree communities, regeneration, competition, and primary and secondary succession.

3. Identify the abiotic and biotic factors in a forest ecosystem, and understand how these factors affect tree growth and forest development. Consider factors such as climate, insects, microorganisms, and wildlife.

**Suggested Activities:**

1. Identify and describe the life cycle of forest pests and invasive plants and describe their impact to a forest ecosystem. Research integrated pest management strategies for selected pests.
2. Draw food webs of a mature deciduous forest and a mature coniferous forest. Explain how wildlife habitat relates to the forest community and describe the niches of various organisms that live in both of these forest ecosystems.
3. Examine a "tree cookie" or core sample taken with an increment borer to determine the age, growing conditions, insect and disease damage, and past weather conditions.
4. Project Learning Tree Activity 7, Understanding Fire: Explore patterns of change brought about by fires in a forest ecosystem.

**Suggested Resources:**

1. Managing Forests for Fish and Wildlife
2. Dendrochronology
3. Project Learning Tree Activity 7: Understanding Fire

# Key Point 3—Sustainable Forest Management

National Science Standards Correlation

**Learning Objectives:**

1. Understand the term silviculture, and be able to explain the uses of the following silviculture techniques: thinning, prescribed burning, single tree and group tree selection, shelterwood method, clear-cutting with and without seed trees, and coppice management.
2. Explain the following silviculture systems: clear-cutting , seed tree method, evenaged management, unevenaged management, shelterwood and selection.
3. Understand the methodology and uses of the following silviculture treatments: Planting, weeding, pre-commercial thinning (PCT), commercial thinning and harvesting.
4. Know how to use forestry tools and equipment in order to measure tree diameter, height and basal area.
5. Understand how the following issues are affected by forest health and management: biodiversity, forest fragmentation, forest health, air quality, aesthetics, fire, global warming and recreation.
6. Understand how forestry management practices and policy affect sustainability.

7. Understand how economic, social and ecological factors influence forest management decisions.
8. Learn how science and technology are being utilized in all aspects of forest management.

**Suggested Activities**:

1. Use the following forestry tools and know how they are used in forest management. clinometer, increment borer, diameter tape, biltmore stick, abney level, and compass, prism and relescope.
2. Use a variety of volume tables to calculate the volume of lumber for several different tree species.
3. Project Learning Tree Activity 8, Fire Management: Learn the many interdependencies of forests and fire in healthy ecosystems.
4. Compare two different forest types. For example: an eastern hardwood forest in PA to a conifer forest in Oregon. Identify economic, social and ecological factors that affect how both of these forests are managed.
5. Explain the Information Technology used to monitor and productively manage forests, and give specific examples of how this technology is being utilized in all aspects of forest management.

**Suggested Resources:**

1. Woodland Management: Measuring your Forests
2. Forest Stewardship -Timber Harvesting: PSU Bulletin 7
3. Forest Stewardship –BMPs: PSU Bulletin 12
4. Project Learning Tree Activity 8, Fire Management
5. Forest Health
6. Technology in the Forest

# Key Point 4—Trees as an Important Renewable Resource

National Science Standards Correlations

**Learning Objectives:**

1. Understand the importance and value of trees in urban and community settings, and know the factors affecting their health and survival.
2. Understand the economic value of forests and know many of the products they provide to people and society.
3. Explain the "Ecosystem Services" provided by trees, and understand why trees and forests are important to human health, recreation, wildlife, and watershed quality.

**Suggested Activities:**

1. Create a display showing the value of trees in both urban and suburban settings. Identify the factors that affect their health and survival, and explain how to properly care for trees in an urban environment.
2. Make a list of products and by-products that come from your home and are made from trees. Describe the chemical and physical properties of trees used in making these products.

**Suggested Resources:**

1. Products from Trees
2. Benefits of Community Trees and Forests
3. Trees and Ecosystem Services

http://www.naturewithin.info/UF/UFdefined.html